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Yang

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(54) **ELECTRIC SWAYABLE TOY**

6,244,925 B1 * 6/2001 Chou 446/354

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* cited by examiner

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(57) **ABSTRACT**

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An electric swayable toy includes a body, a shoulder swayably and pivotally on an upper portion of the body, a pair of legs swayably and pivotally mounted on a lower portion of the body, a pair of arms swayably mounted on the shoulder, a head swayably mounted on the shoulder, a pair of shoes swayably supporting the pair of legs in an inclined manner, and a base supporting and securing the pair of shoes. By such an arrangement, the body includes a main swayable mechanism mounted therein, the shoulder includes an arm swayable mechanism, the main swayable mechanism includes a motor which is rotated continuously in a signal direction and the speed of the motor is reduced by a speed reduction mechanism to actuate an eccentric wheel and a cam mechanism so that the legs, the body, and the shoulder are swayable while the arms and the head are swayable by actuation of the arm swayable mechanism.

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(51) **Int. Cl.**⁷ **A63H 11/00**

(52) **U.S. Cl.** **446/353; 446/330; 40/411; 40/415; 40/418**

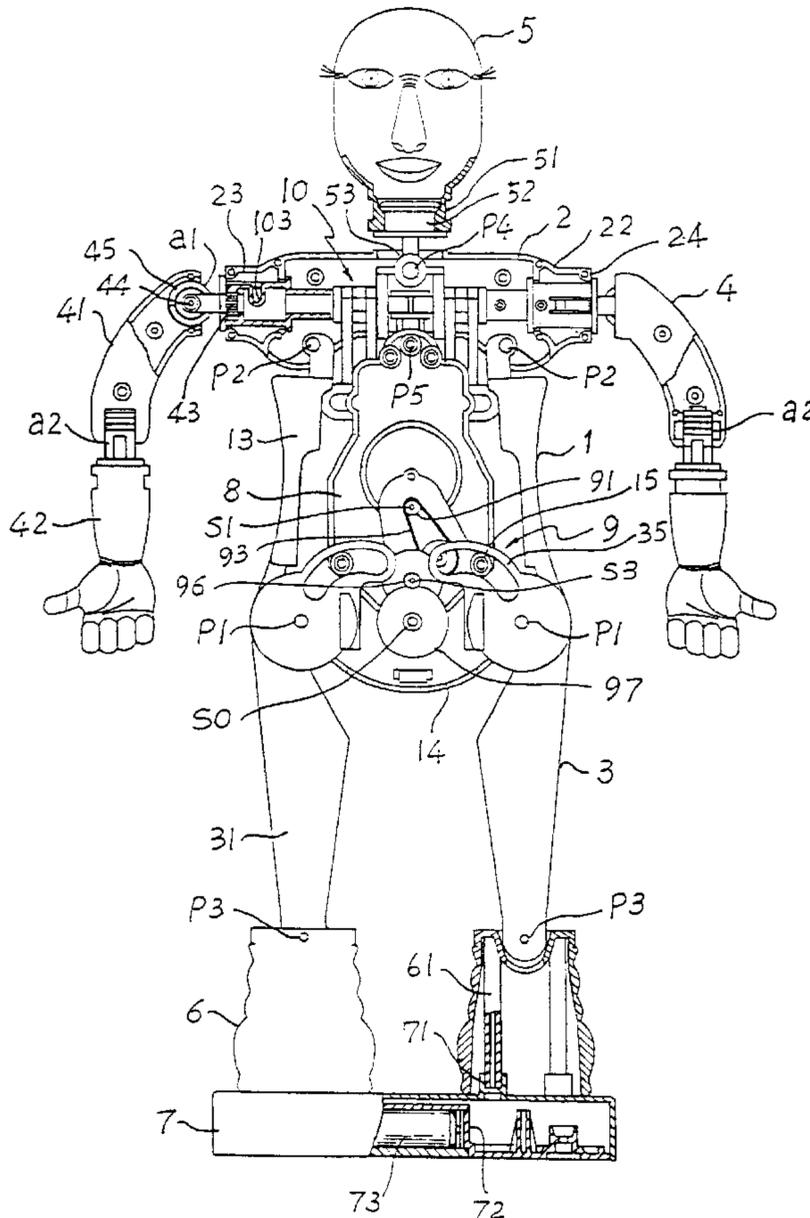
(58) **Field of Search** 446/330, 352, 446/353, 354, 358, 376; 40/411, 415, 418

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2 Claims, 7 Drawing Sheets



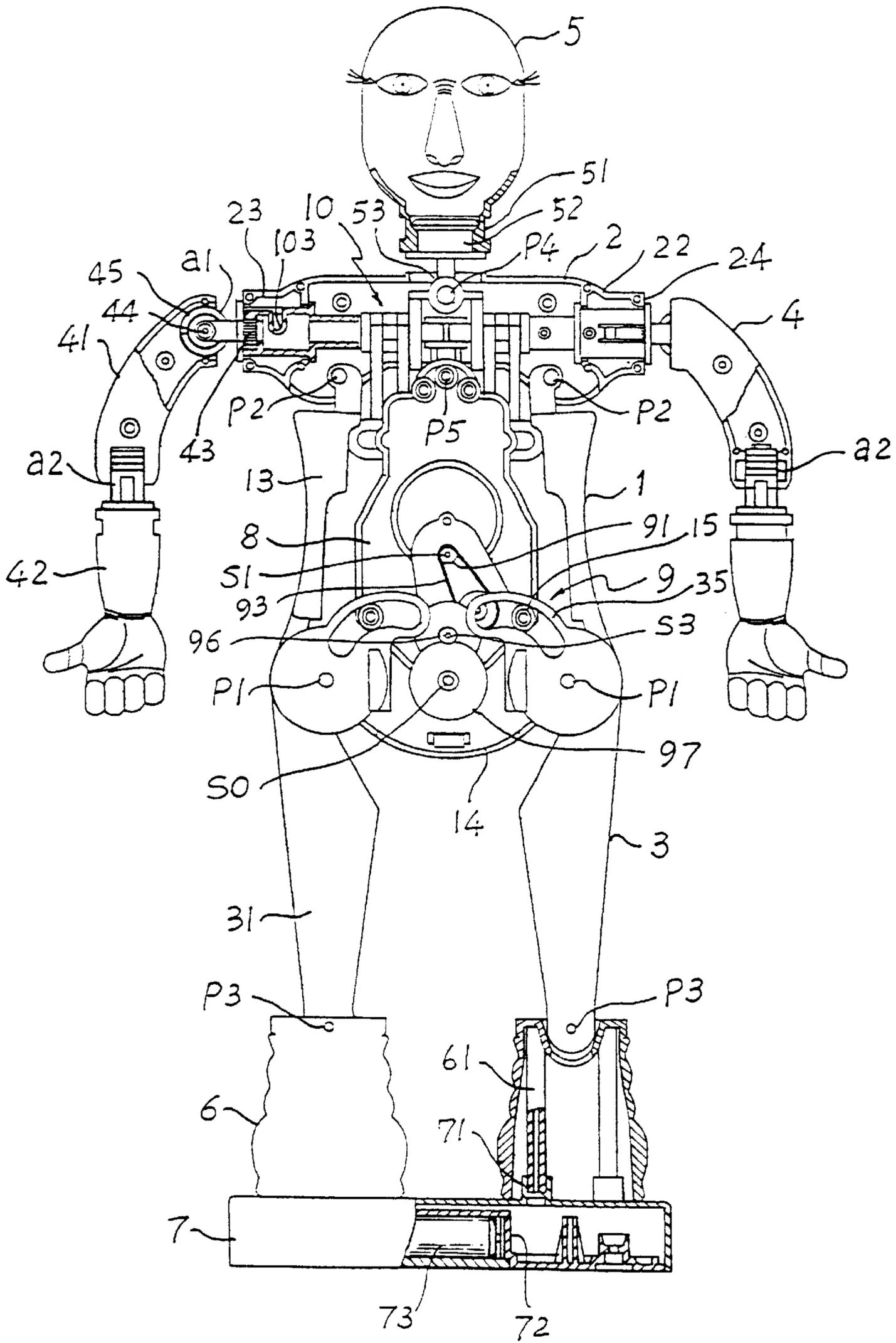


FIG. 1

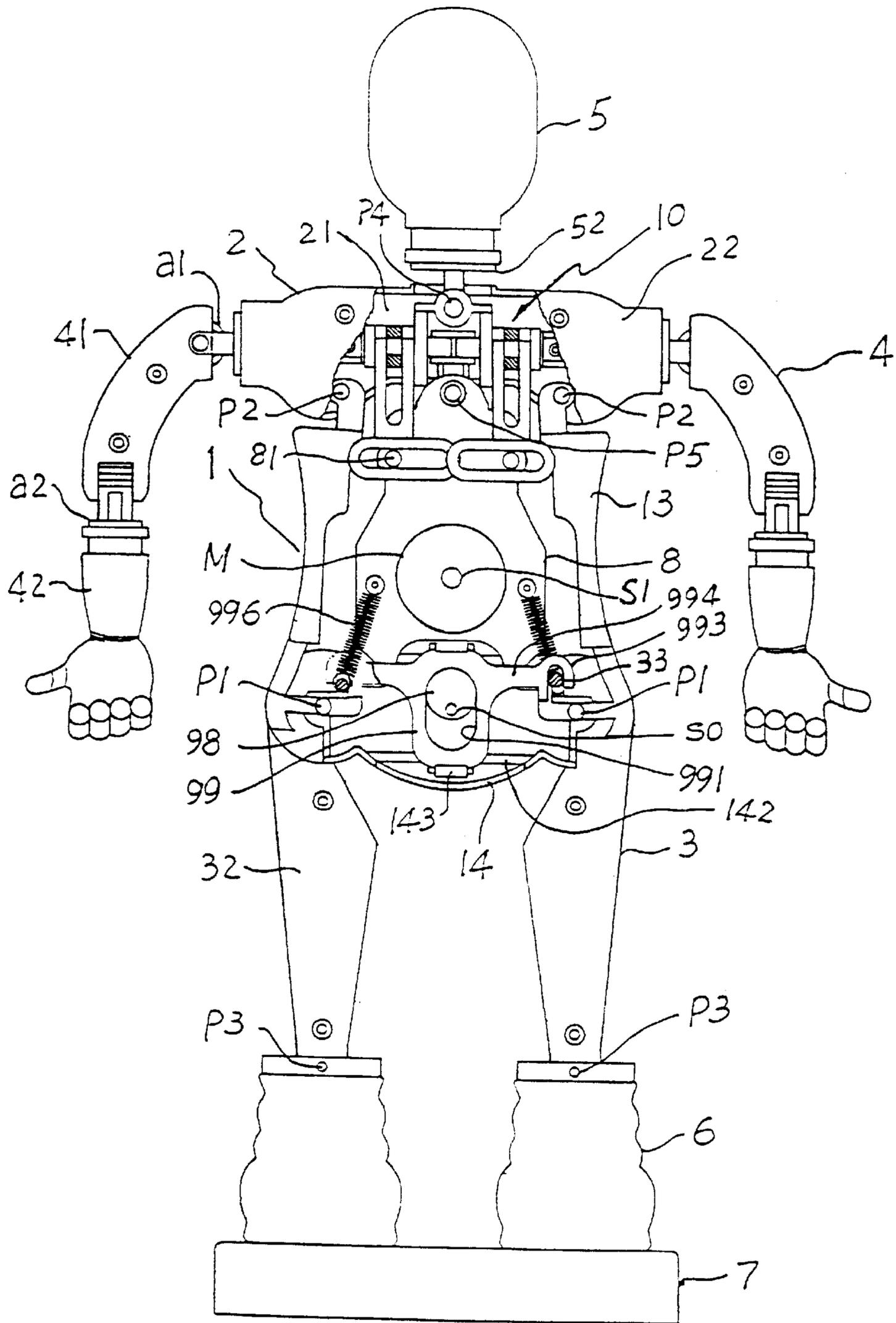


FIG. 2

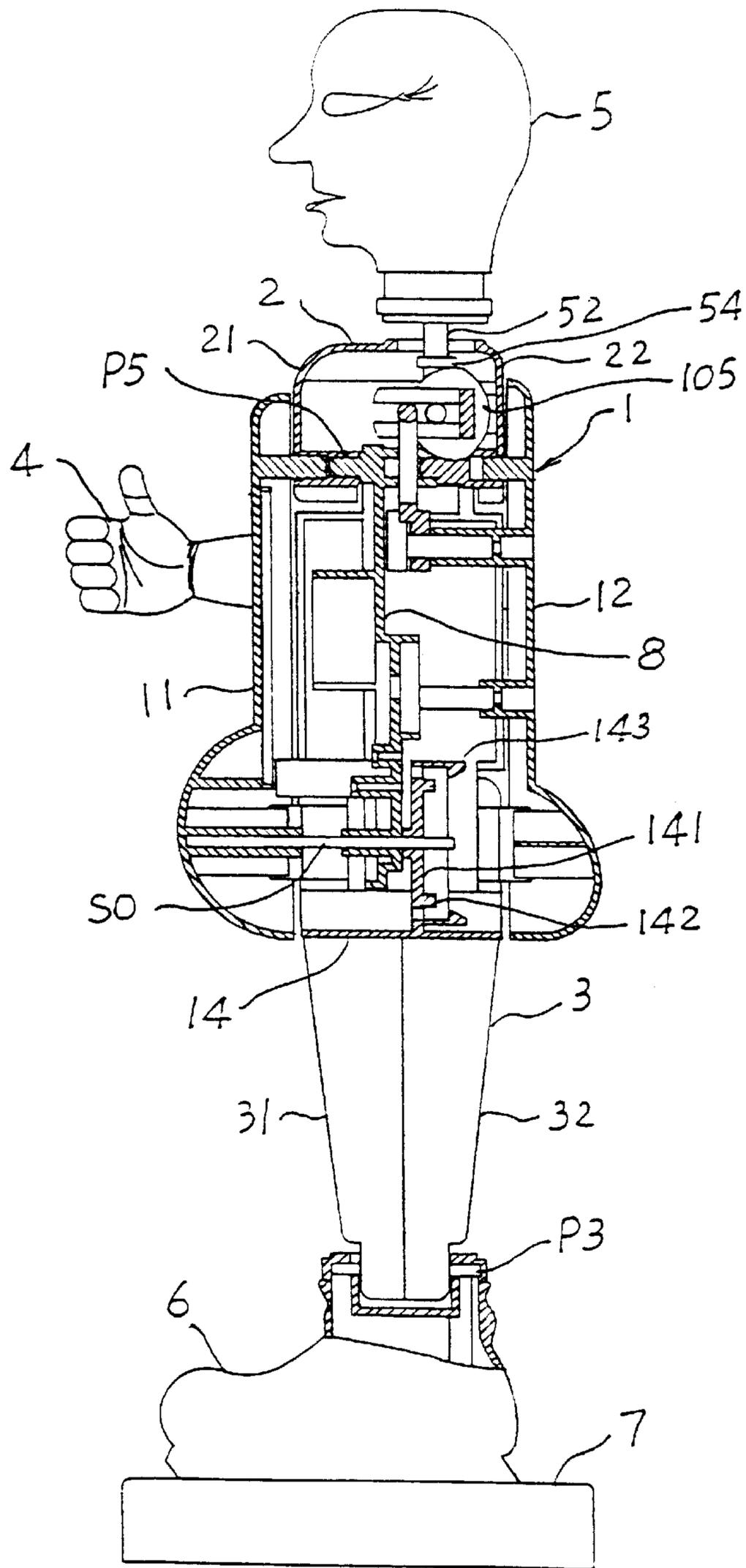


FIG.3

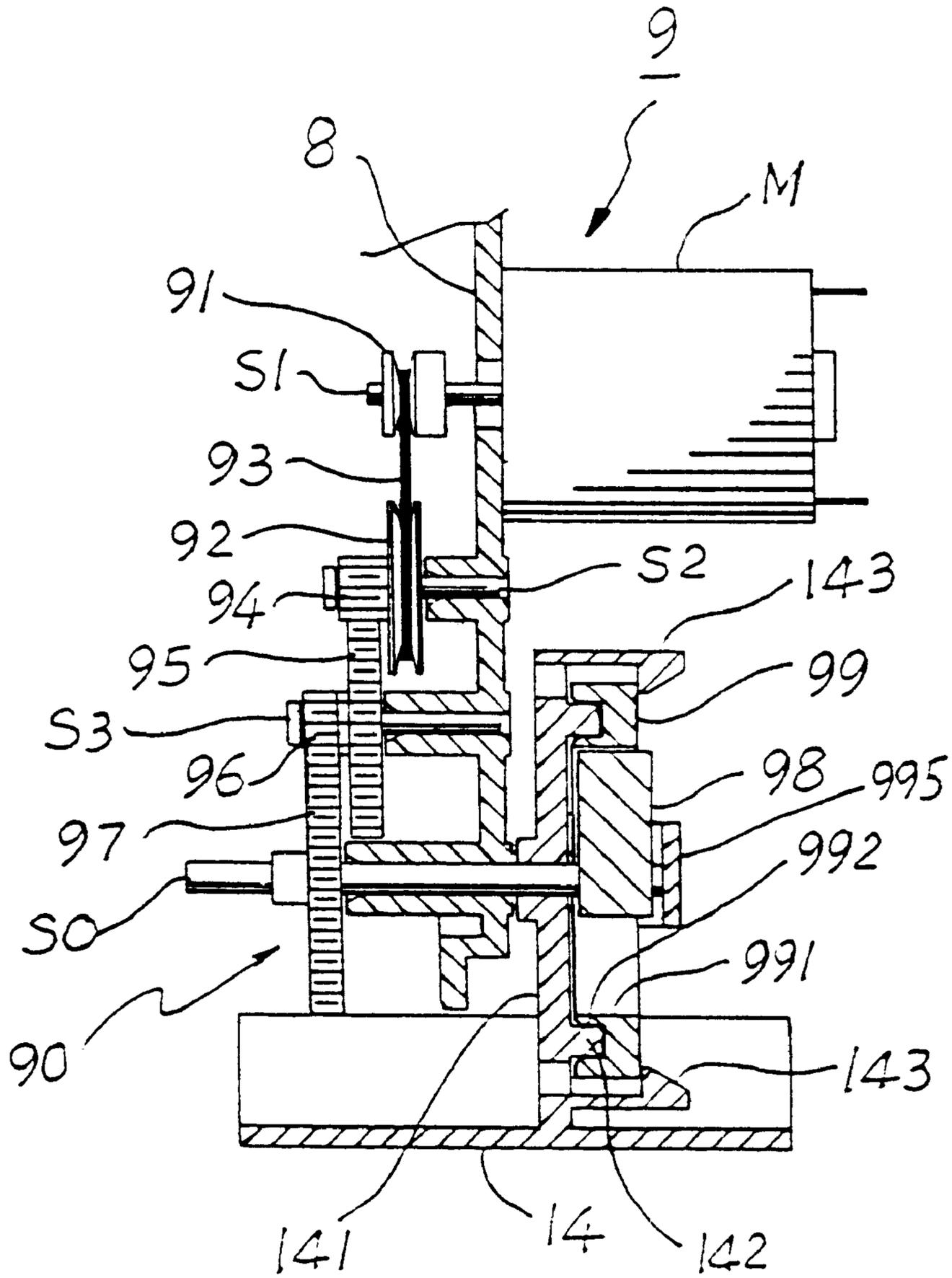


FIG. 4

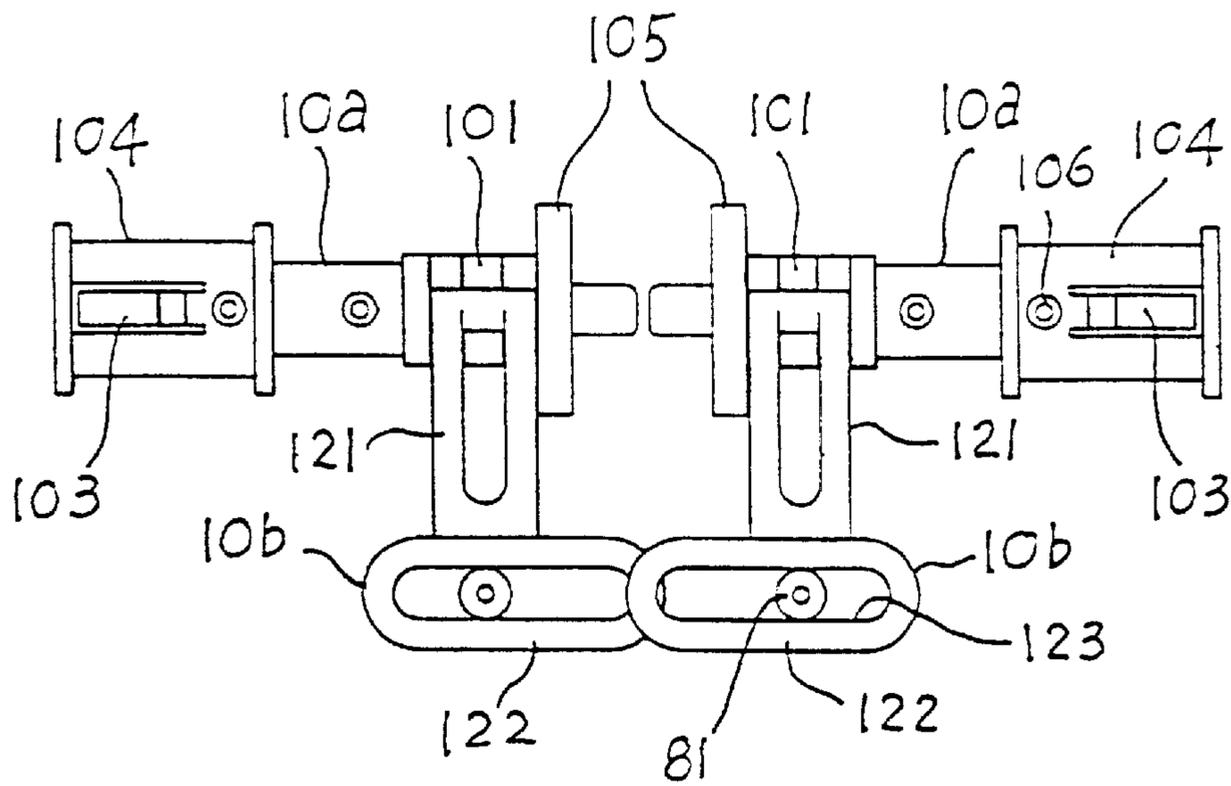


FIG. 5

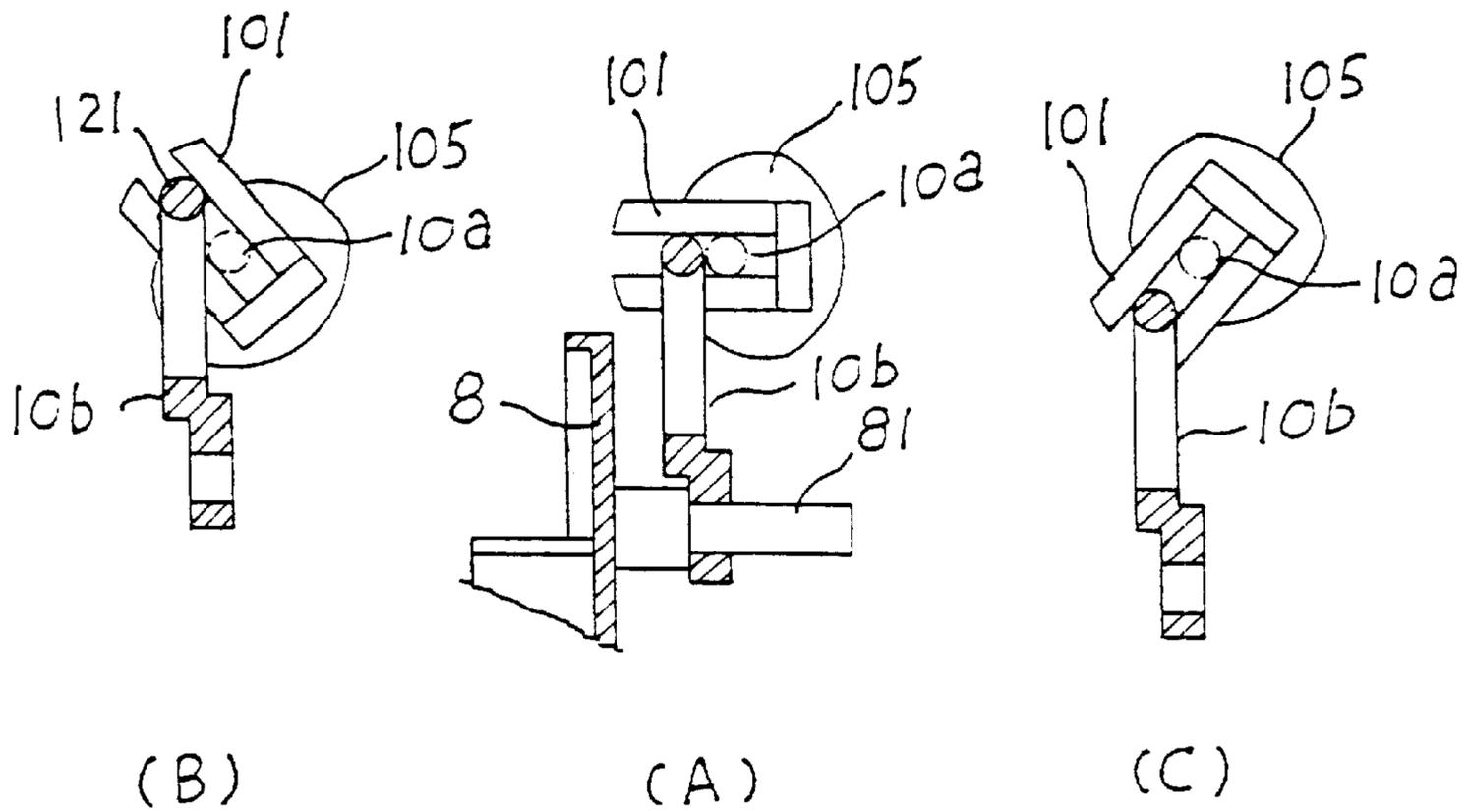


FIG. 6

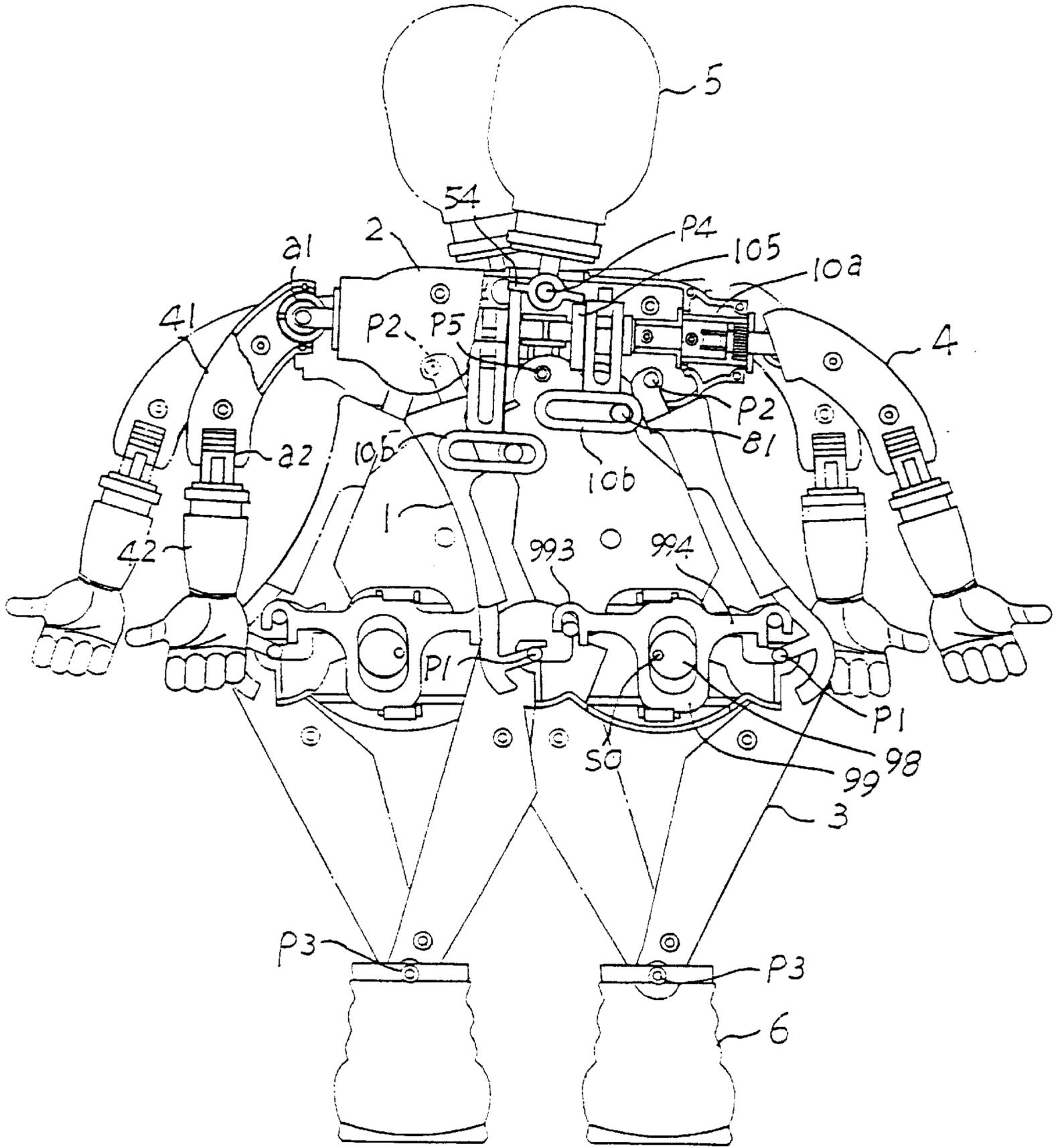


FIG. 7

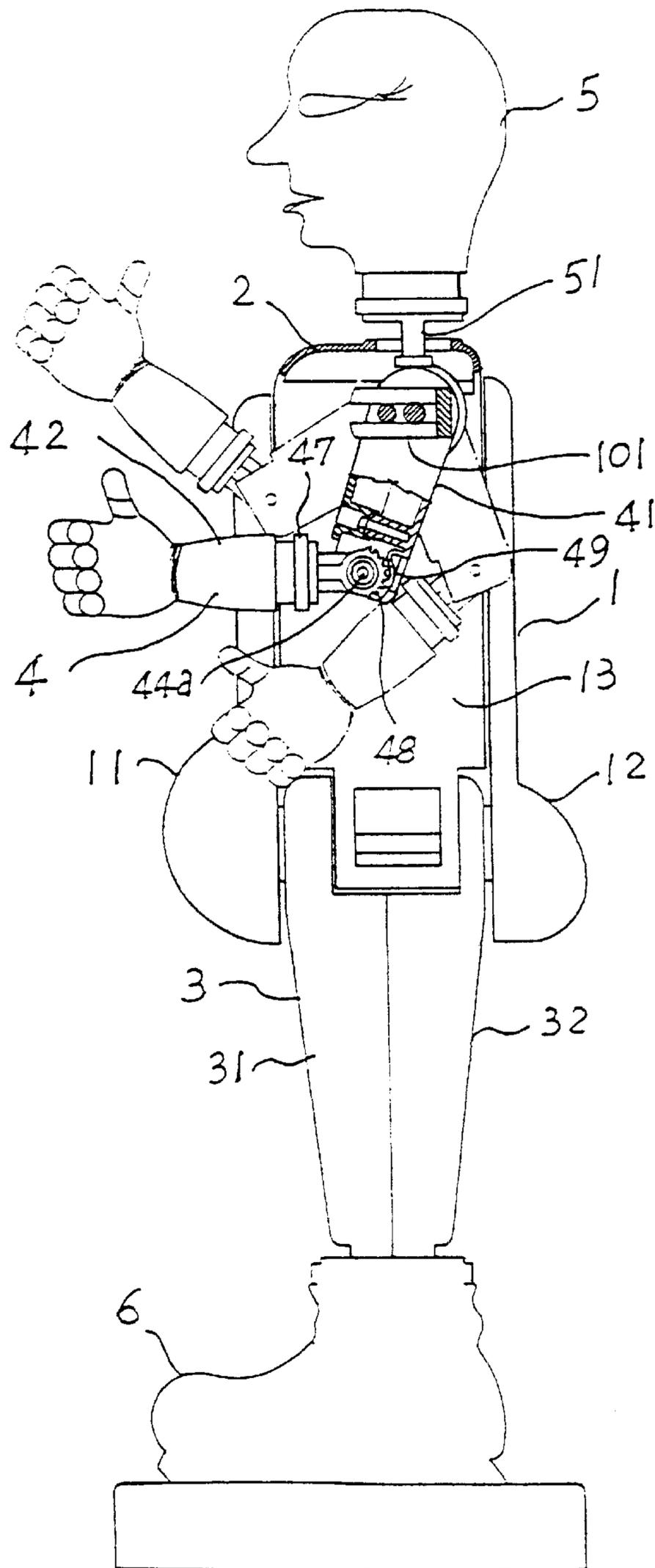


FIG. 8

ELECTRIC SWAYABLE TOY

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an electric swayable toy.

2. Description of the Related Art

Taiwan Utility Model Publication No. 334837 entitled "Swayable device of an toy", discloses a device comprising a motor which actuates sector gears mounted on the joints of a pair of legs of a toy through a gear transmission device. At the same time, an auxiliary tooth track mounted on the other side of the joint of the leg meshes with a tooth track mounted on the back plate of the toy so that the pivot axles of the joints of the legs and the pivot axles of the shoulder construct a four-linkage action so that the two legs and the upper body are oscillated along the different directions.

However, the oscillation of the legs and the body is performed by the gears co-operating with the tooth tracks so that the movement is not smooth. In addition, the shoulder can only be moved in a vertical manner while the head and the two arms are stationary, thereby decreasing the active amusement of the toy.

SUMMARY OF THE INVENTION

In accordance with one aspect of the present invention, there is provided an electric swayable toy comprising:

- a body;
- a shoulder swayably and pivotally on an upper portion of the body;
- a pair of legs swayably and pivotally mounted on a lower portion of the body;
- a pair of arms swayably mounted on the shoulder;
- a head swayably mounted on the shoulder;
- a pair of shoes swayably supporting the pair of legs in an inclined manner; and
- a base supporting and securing the pair of shoes;

wherein, the body includes a main swayable mechanism mounted therein, the shoulder includes an arm swayable mechanism, the main swayable mechanism includes a motor which is rotated continuously in a signal direction and the speed of the motor is reduced by a speed reduction mechanism to actuate an eccentric wheel and a cam mechanism so that the legs, the body, and the shoulder are swayable while the arms and the head are swayable by actuation of the arm swayable mechanism.

The main swayable mechanism includes a motor secured on a rocking board which is swayably mounted in an inside of the body and has an upper end and a lower end respectively pivoted on the shoulder and a lower portion of the body, a speed reduction mechanism including belt wheels and gear sets for reducing the output rotational speed of the motor and increasing the torque of the motor, an eccentric wheel actuated by the speed reduction mechanism, and a cam defining a cam slot for receiving the eccentric wheel and actuated by the eccentric wheel to move reciprocally.

The arm swayable mechanism includes a pair of symmetrical axle members each pivotally mounted in the shoulder, and a pair of symmetrical push/pull bars each including an upright bar portion secured on a follower element of the axle member, and a horizontal bar portion slidably mounted on a pin which is mounted on the rocking board.

The axle members of the arm swayable mechanism are connected with a pair of cams each of which has a top rested

on a wing of a support member of the head, whereby, when the pair of cams are rotated along different directions, the wing is driven to move the head so that the head is pivoted about a pivot axle of a pivot portion.

The distance between the lower portion of the body and a pivot axle of an upper portion of the legs is greater than that between the upper portion of the body and a pivot axle of a lower portion of the shoulder.

An upper arm portion of each of the arms and the axle member of the arm swayable mechanism have a connection portion having a joint which is constructed to be rotatable along a vertical plan and/or a horizontal plane freely, and/or a lower arm portion and an upper arm portion of each of the arms have a connection portion having a joint which is constructed to be rotatable along a vertical plan and/or a horizontal plane freely.

The rocking board has a lower portion having two symmetrical pins each slidably mounted in a guide slot of an arcuate cam formed on an upper portion of each of the arms.

Further benefits and advantages of the present invention will become apparent after a careful reading of the detailed description with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front plan view of an electric swayable toy in accordance with the present invention;

FIG. 2 is a rear plan view of the electric swayable toy as shown in FIG. 1;

FIG. 3 is a side plan cross-sectional view of the electric swayable toy as shown in FIG. 1;

FIG. 4 is a side plan cross-sectional view of a main swayable mechanism of the electric swayable toy as shown in FIG. 1;

FIG. 5 is a front plan schematic view of an arm swayable mechanism of the electric swayable toy as shown in FIG. 1;

FIG. 6A is a side plan view of the arm swayable mechanism of the electric swayable toy as shown in FIG. 5;

FIG. 6B is an operational view of the arm swayable mechanism of the electric swayable toy as shown in FIG. 6A;

FIG. 6C is an operational view of the arm swayable mechanism of the electric swayable toy as shown in FIG. 6A;

FIG. 7 is an operational view of the electric swayable toy as shown in FIG. 2; and

FIG. 8 is an operational view of the electric swayable toy as shown in FIG. 3.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawings and initially to FIGS. 1-3, an electric swayable toy in accordance with the present invention comprises a body 1, a shoulder 2 swayably and pivotally on an upper portion of the body 1, a pair of legs 3 swayably and pivotally mounted on a lower portion of the body 1, a pair of arms 4 swayably mounted on the shoulder 2, a head 5 swayably mounted on the shoulder 2, a pair of shoes 6 swayably supporting the pair of legs 3 in an inclined manner, and a base 7 supporting and securing the pair of shoes 6.

A rocking board 8 is swayably mounted in the inside of the body 1 and has an upper end and a lower end respectively pivoted on the shoulder 2 and a lower portion of the body 1.

The body 5 includes a main swayable mechanism 9 mounted on the rocking board 8. The shoulder 2 includes an

arm swayable mechanism **10** mounted therein. The main swayable mechanism **9** includes a motor **M** which is rotated continuously in a signal direction, and the speed of the motor **M** is reduced by a speed reduction mechanism to actuate an eccentric wheel **98** and a cam mechanism so that the legs **3**, the body **1**, and the shoulder **2** are swayable while the arms **4** and the head **5** are swayable by actuation of the arm swayable mechanism **10**.

The body **1** includes a front cover plate **11** corresponding to the chest and abdomen of the toy, a rear cover plate **12** corresponding to the back of the toy, two side plates **13** corresponding to the waist of the toy, and a bottom plate **14** corresponding to the hip of the toy. The body **1** is pivoted on the legs **3** by pivot axles **P1**.

The shoulder **2** includes a front shoulder plate **21**, and a rear shoulder plate **22**, and is pivoted on the body **1** by a pivot axle **P2**.

Each of the legs **3** includes a front half leg **31**, and a rear half leg **32**. Each of the legs **3** has an upper portion connected to the body by the pivot axle **P1**, and a lower portion pivotally mounted on one of the shoes **6** by a pivot axle **P3**.

Each of the arms **4** includes an upper arm portion **41** and a lower arm portion **42**. The upper arm portion **41** of each of the arms **4** and the axle member **10a** of the arm swayable mechanism **10** have a connection portion having a joint **a1** which is constructed to be rotatable along a vertical plan and/or a horizontal plane freely, and/or the lower arm portion **42** and an upper arm portion **41** of each of the arms **4** have a connection portion having a joint **a2** which is constructed to be rotatable along a vertical plan and/or a horizontal plane freely.

The head **5** includes a neck **51** inserted with a support member **52** which has a lower portion provided with an eye ring **53** which is pivotally mounted on the shoulder **2** by a pivot axle **P4**.

Each of the shoes **6** is inserted into a socket **71** of the base **7** through a pin **61**. The base **7** has a bottom provided with a battery chamber **72** for containing a battery **73**. A switch (not shown) is provided for switching the power supply. The base **7** can be provided with a power receptacle (not shown) for use with an adapter (not shown).

The rocking board **8** is swayably mounted in the inside of the body **1** and has an upper end pivoted on the shoulder **2**, and a lower end pivoted on the bottom plate **14** of the body **1** by a bottom axle **S0**.

The main swayable mechanism **9** as shown in FIG. 4 includes a motor **M** mounted on one side of the rocking board **8** and having an output shaft **S1** protruding outward from the rocking board **8**. A small belt wheel **91** is secured on the output shaft **S1** of the motor **M**. A large belt wheel **92** is rotatably mounted on the rocking board **8** by a shaft **S2**, and is located under the small belt wheel **91**. A belt **93** is mounted between the large belt wheel **91** and the small belt wheel **92** for transmitting the output power of the motor **M**. A first pinion **94** is mounted on the shaft **S2** to rotate with the large belt wheel **92**. A first large gear **95** is rotatably mounted on a shaft **S3**, and meshes with the first pinion **94** to rotate therewith. A second pinion **96** is integrally formed with the first large gear **95** to rotate therewith. A second large gear **97** is secured on a first end of the bottom shaft **S0** of the rocking board **8**, and meshes with the second pinion **96** to rotate therewith. An eccentric wheel **98** is secured on a second end of the bottom shaft **S0** to rotate with the second large gear **97**, wherein the second end of the bottom shaft **S0** extends through the rocking board **8** and an upright plate **141** of the

bottom plate **14**. A cam **99** is mounted on the upright plate **141** of the back of the rocking board **8**, and defines an oblong cam slot **991** for receiving the eccentric shaft **98**.

Horizontal guide track devices **992** and **142** are mounted between the cam **99** and the upright plate **141**, and the cam **99** has two sides each provided with an extension **994** having a hook **993** hooked on a pin **33** of the upper portion of the leg **3**. An elastic detent **143** is mounted on the upright plate **141** of the bottom plate **14** for retaining the cam **99** to prevent from detachment of the cam **99**. A catch plate **995** is mounted on the cam **99** for preventing the eccentric wheel **98** from being detached from the bottom shaft **S0**. The belt wheels **91** and **92**, and the gear sets **94** and **95** construct the speed reduction gear set **90**. Two tension springs **996** are mounted on the back of the rocking board **8** for facilitating operation of the swayable mechanism.

When the motor **M** is rotated, the eccentric wheel **98** is rotated with the large gear **97** whose speed is reduced by the speed reduction gear set **90**. The cam **99** is moved by the eccentric wheel **98** co-operating with the cam slot **991** so that the two extensions **994** will push each of the legs **3** to pivot about the pivot axle **P3** by means of the hook **993** co-operating with the pin **33**.

When each of the legs **3** oscillates, the bottom plate **14** pivoted on the legs **3** by the pivot axle **P1** is moved with the legs **3**. The rocking board **8** pivoted on the bottom plate **14** by the bottom shaft **S0** will oscillate due to the resistance of the springs **996** as shown in FIG. 7.

As shown in FIGS. 1, 5 and 6, the arm swayable mechanism **10** includes a pair of symmetrical axle members **10a** each pivotally mounted in the bearings **23** and **24** of the shoulder **2**, and a pair of symmetrical push/pull bars **10b** each including an upright bar portion **121** secured on a U-shaped forked portion **101** of the axle member **10a**, and a horizontal bar portion **122** slidably mounted on a pin **81** of the rocking board **8** by a transverse slot **123**.

The axle member **10a** has an inner end provided with an axle end **102**, and an outer end provided with a hollow axle end **104** having an elastic pawl **103**. A cam **105** is located adjacent to the forked portion **101**. The axle member **10a** is made of two pieces which are integrally coupled by screws **106**.

When the rocking board **8** is rocked with the body **1** in an inclined manner, the heights of the pins **81** are made different from each other. As shown in FIG. 7, the higher pin **81** pushes the mating push/pull bar **10b** upward, and the lower pin **81** pushes the mating push/pull bar **10b** downward. The two axle members **10a** are pushed by the two push/pull bars **10b** through the forked portion **102** to rotate around a circle along the clockwise direction and the counterclockwise direction respectively as shown in FIGS. 6B and 6C. In such a manner, the legs **4** connected to the hollow axle portion **104** of the axle member **10a** are oscillated with the rocking board **8**.

When the axle members **10a** are rotated by pushing the push/pull bar **10b**, the cams **105** are rotated simultaneously. Each of the cams **105** has a top rested on a wing **54** of the eye ring **53** which is supported on a support member **52** of the head **5**. In such a manner, when the pair of cams **105** are rotated along different directions, the wing **54** is driven to move the head **5** so that the head **5** is pivoted with the arms **4** about a pivot axle **P4**.

Basically, the distance between the pivot axle **P1** and the pivot axle **P3** is greater than that between the pivot axle **P1** and the pivot axle **P2**. In addition, the distance between the two pivot axles **P1** is equal to that between the two pivot

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axles P3, and is greater than that between the two pivot axles P2. In such a manner, P1, P3, P3 and P1 construct a parallelogram, and P1, P2, P2 and P1 construct a trapezoid so that when the legs 3 and the body 1 sway, the shoulder 2 is caused to move upward and downward as shown in phantom lines in FIG. 7.

The joint a1 includes a ratchet wheel 43 rotatably mounted in the hollow axle portion 104 and locked by the elastic pawl 103, an annular element 45 mounted on the other end of the ratchet wheel shaft 43a to rotate relative to the upper arm portion 41 by a shaft 44 and having a locking pawl (not shown), and a semi-circular ratchet wheel 46 formed in the upper arm portion 41 and locked by the locking pawl. The joint a2 includes a plug element 47 secured in the lower arm portion 42, and a semi-circular ratchet wheel 48 rotatably inserted into the lower arm portion 42 by a shaft 44a and locked by a locking pawl 49 which is mounted in the lower arm portion 42.

The rocking board 8 has a lower portion having two symmetrical pins 15 each slidably mounted in a guide slot of an arcuate cam 35 formed on an upper portion of each of the arms 3.

In operation, referring to FIGS. 7 and 8, when the motor M is rotated, the torque of the motor M is transmitted through the belt wheel 91, the belt 93, the belt wheel 92, the gears 94, 95, 96 and 97, and the shaft S0 to the eccentric wheel 98 which is eccentrically rotated in the cam slot 991 of the cam 99 so as to push the cam 99 to move in the guide track devices 992 and 142 reciprocally. The legs 3 are pushed and pulled by the two extensions 994 of the cam 99 to oscillate about the pivot axle 3 in an inclined manner. The two side plates 13 are pivoted about the pivot axle P1 to oscillate in the other direction. The bottom plate 14 pivoted on the pivot axle P1, the rocking board 8 pivoted on the bottom shaft S0, the front cover plate 11 mounted on the front side of the rocking board 8, and the rear cover plate 12 mounted on the rear side of the rocking board 8 are oscillated in the same direction while the shoulder 2 pivoted on the two side plates 13 and the rocking board 8 by the pivot axles P2 and P5 is also oscillated therewith. At the same time, the two arms 4 are also oscillated by actuation of the arm swayable mechanism 10 while the head 5 is moved by the cam 105 of the arm swayable mechanism 10 to pivot about the pivot axle P4 along a direction different from that of the shoulder 2.

In such a manner, when the legs and the waist of the toy are oscillated, the shoulder, the arms and the head can also be oscillated at the same time, thereby increasing the active amusement of the toy.

It should be clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

What is claimed is:

1. An electric swayable toy comprising:

a body,
 a shoulder swayably and pivotally mounted on an upper portion of said body,
 a pair of legs swayably and pivotally mounted on a lower portion of said body,
 a pair of arms swayably mounted on said shoulder,
 a head swayably mounted on said shoulder,
 a pair of shoes swayably supporting said pair of legs,
 a base supporting and securing said pair of shoes,
 a main swaying mechanism mounted in said body, and
 an arm swaying mechanism mounted in said shoulder;
 wherein

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said main swaying mechanism comprises a motor secured on a rocking board which is swayably mounted in an interior of said body and has an upper end and a lower end pivoted on said shoulder and a lower portion of said body respectively, said motor comprises a speed reduction mechanism to reduce a speed of said motor, said speed reduction mechanism comprising belt wheels and gear sets to reduce an output rotational speed of said motor and to increase torque generated by said motor,

said main swaying mechanism further comprising an eccentric wheel actuated by said speed reduction mechanism, and a cam with a cam slot therein to receive said eccentric wheel, said cam being actuated by said eccentric wheel to move reciprocally so that said legs, said body, and said shoulder sway, and wherein

said arm swaying mechanism comprises a pair of symmetrical axle members each pivotally mounted in said shoulder, said axle members being in communication with said rocking board via a pair of symmetrical bars each including a vertical bar portion secured to said axle members, and a horizontal bar portion slidably mounted on a pin which is mounted on said rocking board, said axle members being connected to a pair of cams, each said cam having a top that rests on a wing of a support member of said head, such that when said pair of cams are rotated in different directions, said wing is driven to move said head so that said head is pivoted about a pivot axle of a pivot portion.

2. An electric swayable toy comprising:

a body,
 a shoulder swayably and pivotally mounted on an upper portion of said body,
 a pair of legs swayably and pivotally mounted on a lower portion of said body,
 a pair of arms swayably mounted on said shoulder,
 a head swayably mounted on said shoulder,
 a pair of shoes swayably supporting said pair of legs,
 a base supporting and securing said pair of shoes,
 a main swaying mechanism mounted in said body, and
 an arm swaying mechanism mounted in said shoulder;
 wherein

said main swaying mechanism comprises a motor secured on a rocking board which is swayably mounted in an interior of said body and has an upper end and a lower end pivoted on said shoulder and a lower portion of said body respectively, said motor comprises a speed reduction mechanism to reduce a speed of said motor, said speed reduction mechanism comprising belt wheels and gear sets to reduce an output rotational speed of said motor and to increase torque generated by said motor,

said main swaying mechanism further comprising an eccentric wheel actuated by said speed reduction mechanism, and a cam with a cam slot therein to receive said eccentric wheel, said cam being actuated by said eccentric wheel to move reciprocally so that said legs, said body, and said shoulder sway, and wherein

said rocking board has a lower portion having two symmetrical pins each slidably mounted in a guide slot of an arcuate cam formed on an upper portion of each of said legs.